

We Claim:

[00106] ✓ A method for monitoring the performance of a network including at least one node that communicates with the network using a transaction-based protocol, the method comprising:

monitoring particular characteristics of transaction-based protocol exchanges to and/or from said node; and

deriving round-trip network latency in response to said monitoring.

[00107] 2. The method of claim 1 wherein the monitoring step includes monitoring SYN bit acknowledgment.

[00108] 3. The method of claim 1 wherein said monitoring step includes monitoring TCP data packet acknowledgment.

[00109] 4. The method of claim 1 wherein said monitoring step includes monitoring TCP slow start turnaround.

[00110] 5. The method of claim 1 wherein said monitoring step includes monitoring TCP zero to non-zero window turnaround.

[00111] 6. The method of claim 1 wherein said monitoring step includes monitoring TCP FIN bit acknowledgment.

[00112] 7. The method of claim 1 wherein said deriving step includes deriving and subtracting delays associated with processing by a further node communicating over the network with said first-mentioned node.

[00113] 8. The method of claim 1 wherein said monitoring and deriving steps are performed at a plurality of network sites remote from said node, or co-located with said node.

[00114] 9. The method of claim 1 further including reporting said derived results.

[00115] 10. The method of claim 9 wherein said reporting step comprises generating a web page.

[00116] 11. The method of claim 9 wherein said reporting step includes providing a web-page-based report over said network.

[00117] 12. The method of claim 1 wherein said monitoring and deriving steps are performed on a subscription basis.

[00118] 13. The method of claim 1 wherein said monitoring step includes coupling a monitoring node to said network and operating the monitoring node in a promiscuous mode.

[00119] 14. The method of claim 1 wherein said monitoring step includes monitoring transaction-based protocol traffic and breaking down response time into a plurality of different components including round-trip network latency.

[00120] 15. A subscription-based remote monitoring service comprising:
initiating a monitoring subscription over the Internet, including obtaining at least one network address to be monitored;

remotely monitoring, over said network, transactions involving said network address; and

deriving network latency and device latency in response to said monitoring.

[00121] 16. A remote network monitor comprising:
a receiver coupled to a network, said receiver receiving requests and responses from at least one node located remotely from said receiver on the network;
a protocol analyzer coupled to said receiver, said protocol analyzer isolating

features of received requests and responses and logging times associated with each; and

a latency calculator that calculates, in response to said logging, latency associated with said network and latency associated with said node.

[00122] ~~17.~~ A method of determining communications protocol latency including:

monitoring HTTP traffic flowing between a web server and a web client; and

using the web server's initial HTTP reply packet as the logical dividing line for the web client to web server HTTP packet exchange,

wherein said logical dividing line is used to distinguish initial web server reply time from network transport time.

[00123] 18. The method of claim 17 wherein the network transport time comprises the time spent from a first HTTP data packet until a last HTTP data packet for a transaction has arrived from the web server.

[00124] 19. A method of determining communications protocol latency including:

monitoring TCP traffic between a server and a client; and

using an IP Header sequence number to help distinguish out-of-order TCP packets from retransmitted TCP data packets each carrying HTTP data.

[00125] ~~20.~~ A method of determining communications protocol latency including:

monitoring TCP traffic between a server and a client; and

using an initial exchange between said server and said client and TCP header flags to determine whether an initial HTTP reply is retransmitted.

- [00126] 21. The method of claim 20 further including using retransmission time as time to discount when calculating web server processing time.
- [00127] 22. The method of claim 20 further including using retransmission time as time to discount when calculating TCP connect processing time.
- [00128] 23. The method of claim 20 further including continually calculating transport-to-transport network latency to obtain minimum network latency for at least one TCP session.
- [00129] 24. The method of claim 20 further including using round trip network latency as time to discount when calculating web server processing time.
- [00130] 25. The method of claim 20 further including using round-trip network latency as time to discount when calculating TCP connect processing time.
- [00131] ~~26.~~ A method of calculating communication latency by monitoring a communications protocol over a network comprising:
- monitoring protocol traffic between a client and a server over the network; continually calculating network retransmission time; and taking said calculated network retransmission time into account when computing web server processing time and TCP connect time and the number of packets lost.
- [00132] ~~27.~~ A method of determining whether web page content is static or dynamic including:
- monitoring HTTP protocol traffic between a web client and a web server over a network; and using an HTTP initial request and reply to determine if the content of at least one web page hosted by the web server is static or dynamic.

[00133] 28. A method of determining web server processing time including:
monitoring communications between said web server and at least one client;
and

discounting at least one retransmitted HTTP Get or HTTP Post request from
said client as web server processing time.

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